

ASSIGNMENT 12

Textbook Assignment: "Direct Leveling and Basic Engineering Surveys." Pages 14-25 through 14-47.

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- 12-1. Fieldwork on the construction of a road being built on a 5-year-old naval air station would very likely begin with what type of survey?
1. Final location
 2. Topographic
 3. Reconnaissance
 4. As-built
- 12-2. What is the first step in a reconnaissance survey?
1. A field trip to the desired location
 2. A study of existing maps and aerial photographs
 3. An instrument survey of the desired location
 4. An inventory of available construction equipment
- 12-3. Direct air observation of an area to be reconnoitered offers what main advantage?
1. Acquiring information about the relief of the area
 2. Providing a quick means of preparing sketches of the area
 3. Speeding subsequent ground reconnaissance of the area
 4. Providing a quick means of preparing maps of the area
- 12-4. A field reconnaissance party follows the route previously marked on a map to verify actual conditions on the ground. Which of the following conditions, relative to an engineering study, should be noted?
1. Soil conditions and washout areas
 2. Vegetation and obstacles
 3. Quarry sites and sand or gravel deposits
 4. All of the above
- 12-5. Which of the following tasks in constructing a highway is part of the preliminary survey?
1. Establishing final grades and alignments
 2. Computing the highway right-of-way
 3. Running the traverse
 4. Setting grade stakes
- 12-6. Your survey party is assigned the task of completing a reconnaissance survey of a 3-mile road in hilly, wooded terrain. For this survey, your party should carry which of the following equipment?
1. Lensatic compass
 2. Brush hook
 3. Hand level
 4. All of the above
- 12-7. As the lead surveyor laying out the final location of a roadway center line, you suspect that the preliminary survey was in error regarding the exact location of the center line. Which of the following actions should you take?
1. Lay out the center line according to the preliminary data
 2. Lay out the center line the way you know it should be
 3. Lay out the center line and then report the reason for making the necessary change
 4. Report the problem and receive authorization before making the location change
- 12-8. Which of the following details must be shown on a plan view of a proposed highway?
1. Curve design data
 2. Gradient
 3. Spot elevations
 4. Typical cross section of the highway
- 12-9. When plotting a profile, you should use which of the following (a) horizontal and (b) vertical scales?
1. (a) 1" = 200' (b) 1" = 20'
 2. (a) 1" = 20' (b) 1" = 200'
 3. (a) 1" = 135' (b) 1" = 15'
 4. (a) 1" = 205' (b) 1" = 20'

12-10. You have just plotted the profile of a road section from station 6 + 00 to station 9 + 81. The elevation of station 6 + 00 is 100.00 feet and that of station 9 + 81 is 93.30 feet. What is the gradient between these stations?

1. +1.76%
2. -1.76%
3. +17.60%
4. -17.60%

12-11. What kind of information is presented in the typical cross section of a proposed highway?

1. Design data for the highway
2. Details of the representative terrain over which the highway will be built
3. Factors establishing a need for the highway
4. Schedule of the office tasks to be performed before the construction of the highway

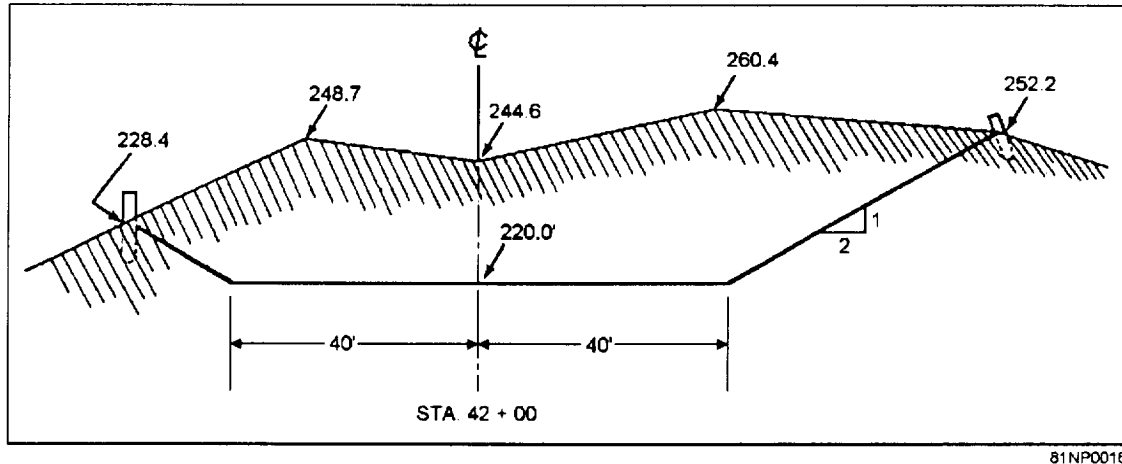


Figure 12A

IN ANSWERING QUESTIONS 12-12 THROUGH 12-15, REFER TO THE CROSS SECTION OF THE PROPOSED HIGHWAY SHOWN IN FIGURE 12A.

12-12. What is the finished grade elevation?

1. 260.4 ft
2. 248.7 ft
3. 244.6 ft
4. 220.0 ft

12-13. How should you write the side slope ratio?

1. 1:2
2. 2:1
3. 1/2
4. 2/1

12-14. What type of cross section is shown?

1. Level
2. Five-level
3. Three-level
4. Four-level

12-15. This cross section may also be called what type of section?

1. Regular
2. Irregular
3. Standard
4. Sidehill

12-16. On the cross-section paper most widely used in surveying offices, the horizontal lines are spaced how far apart?

1. 1/20 in
2. 1/10 in
3. 1/5 in
4. 1/4 in

12-17. After the surface elevations have been plotted on the cross-section paper, the points should be connected in which of the following ways?

1. By freehand curves
2. By freehand straight lines
3. By lines drawn with a straightedge
4. Either 2 or 3 above

12-18. In the plotting of cross sections, the vertical scale relates to the horizontal scale in which of the following manner?

1. The vertical scale must be equal to the horizontal scale
2. The vertical scale must be exaggerated from the horizontal scale
3. The vertical scale may be equal to the horizontal scale, or it may be exaggerated for clarity
4. The vertical scale is usually less than the horizontal scale, but it may be equal or exaggerated for clarity

IN ANSWERING QUESTIONS 12-19 THROUGH 12-21, REFER TO FIGURE 14-29 IN YOUR TEXTBOOK.

12-19. The plotted cross sections are called irregular for what reason?

1. Sections are plotted at a full station and at a section between two full stations
2. The vertical and horizontal scales are different
3. Intermediate elevations are plotted at varying distances from the center line
4. More elevations were plotted for the section at station 11 + 00 than for the section at station 11 + 43

12-20. Notice that the cross-section notes show only two ground elevations to the right of the center line at station 11 + 43. Assume that an additional reading could have been obtained at a point 10 feet to the right of the center line but was not. Refer to the plotted cross section of the station and furnish the entry for this point.

1. $\frac{10}{5.1}$
(80.1)
2. $\frac{10}{8.6}$
(67.0)
3. $\frac{10}{2.4}$
(74.3)
4. $\frac{10}{9.7}$
(67.0)

12-21. The HI for station 14 + 00 is

1. 76.70
2. 78.90
3. 81.60
4. 85.22

12-22. What points are plotted in a three-level section?

1. The roadway edges, slope stakes, and center line
2. The depth of cut or fill and the amount of earth to be moved
3. The left-hand slope stake, right-hand slope stake, and center line
4. The left-hand roadway edge, right-hand roadway edge, and center line

12-23. During what stage of a road construction project are "blue tops" used?

1. Rough grading
2. Clearing and grubbing
3. Final grading
4. Paving

12-24. The natural earth surface below the pavement of a highway is called the

1. final grade
2. finish grade
3. rough grade
4. subgrade

12-25. Which of the following markings on a grade stake indicates a cut of 2.6 feet?

1. C $2\frac{6}{10}$
2. - $2\frac{6}{10}$
3. V $2\frac{6}{10}$
4. Each of the above

12-26. You wish to indicate a cut of 2.6 feet on a stake that is not a centerline stake. You should write the cut information on what part of the stake?

1. Front
2. Back
3. Right side
4. Left side

IN ANSWERING QUESTIONS 12-27 AND 12-28, YOU ARE SETTING GRADE STAKES BY THE PROCEDURE THAT INVOLVES COMPLETING THE NECESSARY COMPUTATIONS WHILE AT EACH STATION.

12-27. You can obtain the grade rod by taking the difference between what two measurements?

1. The HI and the ground elevation
2. The HI and the finished grade
3. The finished grade and the ground elevation
4. The width of the highway and the width of the fill or cut

12-28. You can obtain the amount of cut or fill for a given station by computing the sum of or difference between what two measurements?

1. The HI and the finished grade
2. The ground elevation and the ground rod
3. The ground rod and the grade rod
4. The HI and the ground rod

IN ANSWERING QUESTIONS 12-29 AND 12-30, YOU ARE SETTING A CENTERLINE GRADE STAKE AT A STATION WHERE THE EXISTING GROUND ELEVATION IS 98.6 FEET AND THE REQUIRED ELEVATION IS 110.3 FEET.

12-29. At this station, you obtain a reading of 6.3 feet. What is the (a) grade rod and (b) ground rod?

1. (a) 6.3 (b) 104.9
2. (a) 5.4 (b) 6.3
3. (a) 6.3 (b) 5.4
4. (a) 104.9 (b) 5.4

12-30. What information should you mark on the front of the grade stake?

1. C $5\frac{4}{5}$ and the station number
2. F $6\frac{3}{5}$ and the station number
3. $\text{C}_{\frac{4}{5}}$ and the station number
4. F $11\frac{7}{5}$ and the station number

12-31. What is the slope stake distance from the center line if $W/2 = 18$ feet, $h = 6$ feet, and the slope ratio is 2:1?

1. 21 ft
2. 24 ft
3. 30 ft
4. 42 ft

QUESTIONS 12-32 AND 12-33 PERTAIN TO THE SETTING OF SLOPE STAKES FOR A CUT SECTION. THE DISTANCE FROM THE CENTER LINE TO THE BEGINNING OF THE SIDE SLOPE IS 22 FEET. THERE IS A CROSSFALL OF 0.5 FEET AND A DITCH $2\frac{1}{2}$ FEET IN DEPTH. THE SIDE SLOPE AND BACK SLOPE RATIO IS 3:1, AND h IS 8 FEET.

12-32. What is the value of $W/2$?

1. 7.5 ft
2. 22.0 ft
3. 29.5 ft
4. 38.5 ft

12-33. What is the slope stake distance from the center line?

1. 24.0 ft
2. 29.0 ft
3. 44.0 ft
4. 62.5 ft

As rodman, you are setting slope stakes at station 7 + 00, and the instrumentman is 100 yards away. You have obtained the following information from notes and plans:

W/2 = 20 FEET
 SLOPE RATIO = 2:1
 FINISHED GRADE ELEVATION AT CENTER LINE = 156.3 FEET
 GROUND ELEVATION AT CENTER LINE = 160.8 feet
 HI = 165.0 FEET

Figure 12B

IN ANSWERING QUESTIONS 12-34 THROUGH 12-38, REFER TO FIGURE 12B.

12-34. What is the cut at center line?

1. 4.2 ft
2. 4.5 ft
3. 4.8 ft
4. 8.7 ft

12-35. What should the rod reading be at the center line?

1. 4.2 ft
2. 4.5 ft
3. 4.8 ft
4. 8.7 ft

12-36. What should your initial estimate of d be?

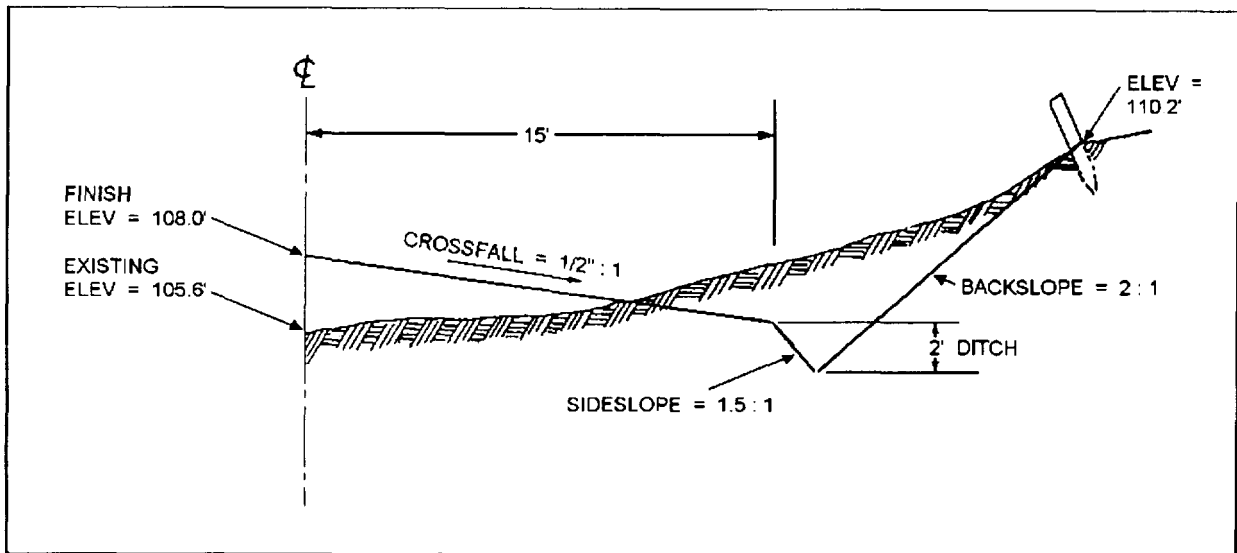
1. 20.0 ft
2. 28.4 ft
3. 29.0 ft
4. 40.0 ft

12-37. As you walk to the initial estimate of d, you observe a drop of approximately 3 feet in the ground elevation. Your second estimate of d is

1. 23.0 ft
2. 25.4 ft
3. 32.0 ft
4. 47.0 ft

12-38. At the second estimate of d, the rod reading is 7.2 feet. You know your second estimate of d is

1. correct
2. 0.5 ft short
3. 0.5 ft long
4. 1.0 ft long



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Figure 12C

IN ANSWERING QUESTIONS 12-39 AND 12-40,
REFER TO FIGURE 12C.

- 12-39. What type of cross section is shown?
1. Level
 2. Three-level
 3. Five-level
 4. Sidehill
- 12-40. What is the distance from the center line to the slope stake?
1. 25.4 ft
 2. 27.4 ft
 3. 27.6 ft
 4. 32.4 ft
- 12-41. In curb construction, construction crews should obtain line and grade from which of the following sources?
1. Center-line stakes
 2. Blue tops
 3. Shoulder stakes
 4. Offset hubs
- 12-42. Pavement stakeout is primarily dependent upon which of the following factors?
1. The type of instruments used to perform the stakeout
 2. The type of equipment used for paving
 3. The finish grade elevations
 4. The directions from the construction crew leader
- 12-43. In checking the accuracy of a 9- by 12-foot rectangular layout by means of the Pythagorean theorem, you should find the diagonal to measure what distance?
1. 15 ft
 2. 18 ft
 3. 20 ft
 4. 25 ft
- 12-44. The batter boards should be placed how far from the building lines so as not to interfere with construction?
1. 1 to 2 ft
 2. 2 to 3 ft
 3. 3 to 4 ft
 4. 4 to 5 ft
- 12-45. When batter boards are used to preserve building lines, horizontal and vertical controls are provided by
1. cords stretched between the top edges of the batter boards
 2. the side edges of the batter boards
 3. the vertical edges of the batter boards
 4. the top edges of the stakes that hold the batter boards
- 12-46. The invert elevation of an underground sewer pipe is taken at what point on the pipe?
1. Lowest outside surface
 2. Highest inside surface
 3. Lowest inside surface
 4. Highest outside surface
- 12-47. For any construction project, what is the optimum time for the as-built survey to begin?
1. During the layout survey
 2. As soon as stakeout is completed
 3. Upon final project completion
 4. During construction as the individual features are completed
- 12-48. Red flagging should be used on the legs of your instrument when you are surveying in the vicinity of which of the following areas?
1. Airstrips
 2. Excavations
 3. Logging operations
 4. Blasting operations
- 12-49. Which of the following actions should you take when you are running a tape-transit traverse that crosses electric wires?
1. Stretch the tape above the wires
 2. Ground one end of the tape
 3. Break chain at the wires
 4. Wear rubber gloves
- 12-50. Excavations that are what minimum depth, in feet, must be suitably braced and shored to prevent cave-ins?
1. 5
 2. 2
 3. 3
 4. 4